Seattle Public Utilities

Protecting Seattle's Waterways

Volume 1

Executive Summary

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Seattle Public Utilities | Protecting Seattle's Waterways

Contents

Volume 1

Executive Summary

The City of Seattle (the City) is preparing a comprehensive strategy, called The Plan to Protect Seattle's Waterways, to reduce overflows and discharge of pollutants from combined sewers and the storm drain system. The City must correct this problem to protect public health, the environment, to comply with the Clean Water Act, the United States District Court Consent Decree, and state regulations. The Plan proposes two alternatives to reach compliance. One alternative, the Long Term Control Plan, will control all uncontrolled combined sewer overflows by 2025. The second alternative, the Integrated Plan, will integrate the control of combined sewer overflows with the reduction of pollutants from stormwater discharges and defer some low priority CSO projects beyond 2025.

What is the Plan to Protect Seattle's Waterways?

Seattle is served by a combined sewer system (CSS) that handles both stormwater and wastewater generated by businesses and residents. Heavy rains can overwhelm the CSS pipes and cause Combined Sewer Overflows, or CSOs. These events of sewage discharge can contribute pollutants to surrounding water bodies and can impact their quality and uses. In addition, stormwater runoff from streets, parking lots, and buildings in separate pipes contributes a wide range of pollutants to the city's waters.

The City of Seattle (the City) is preparing a comprehensive strategy, called The Plan to Protect Seattle's Waterways, to reduce overflows and the discharge of pollutants from combined sewers and the storm drain system. Specifically, the Plan achieves the following objectives:

- Identify areas of Seattle where projects are needed to reduce CSOs.
- Evaluate alternatives for reducing CSOs in these areas.
- Identify additional areas where projects to control and reduce polluted stormwater runoff will improve water quality.
- Recommend a schedule for designing and constructing projects.
- Estimate program costs and associated rate impacts on City customer bills.
- Consider public and stakeholder input.

There are 4 Volumes included in the Plan to Protect Seattle's Waterways. This Executive Summary is Volume 1, followed by Volume 2 Long Term Control Plan (LTCP), Volume 3 Integrated Plan, and Volume 4 Environmental Impact Statement (EIS).

What is stormwater runoff?

Stormwater is rain and melting snow that runs off surfaces that cannot readily absorb water, such as streets, rooftops, and parking lots. As stormwater runs across these hard surfaces, it picks up pollutants such as oil, grease, and metals, carrying them through the City's storm drain system to lakes, streams, rivers, and Puget Sound. It also flows into the combined sewer system and causes overflows of raw sewage and polluted stormwater into Seattle waterways. Recent scientific studies have determined that polluted stormwater runoff poses a significant impact to local water quality.

Why are CSOs a problem?

About two-thirds of Seattle is served by a combined sewer system, which was designed to carry sewage and stormwater runoff from streets, rooftops, and parking lots in a single pipe—a "combined sewer". Under dry weather conditions in Seattle, all sewage flows to the treatment plant. During wet weather conditions however, stormwater runoff is considerable and can cause the capacity of the CSS to be exceeded. When this mixture of stormwater (about 90%) and raw sewage exceed the pipe's capacity, it results in a CSO.

The image in Figure ES-1 depicts how overflows can occur under heavy rain conditions in combined sewer systems.

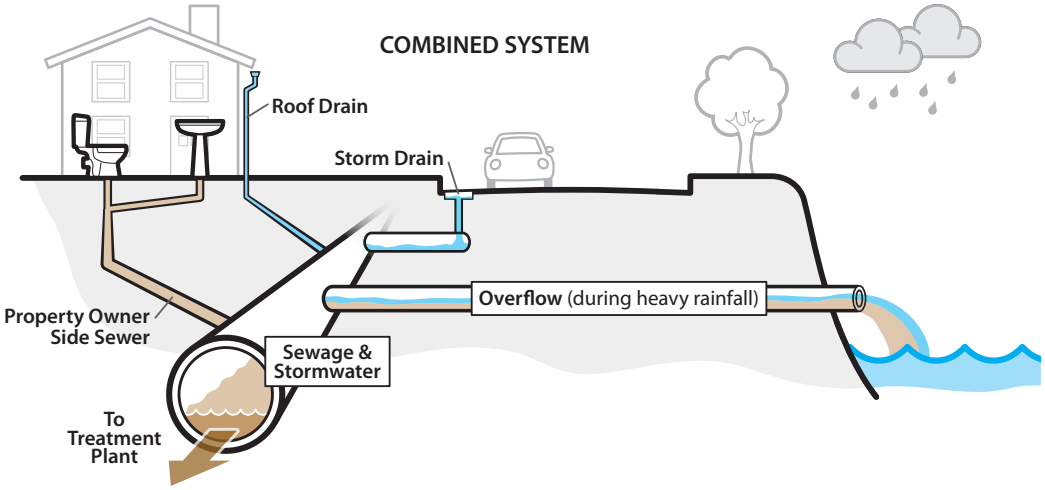


Figure ES-1. Schematic of a CSO

Combined Sewer Overflow Quick Facts

The City of Seattle and King County both manage CSO outfalls in the Seattle area: the City manages 87 outfalls; King County manages 38.

A volume of 38 million gallons discharged in 219 CSO events at City managed outfalls during 2013.

How is Stormwater Involved?

In some neighborhoods in Seattle, stormwater is not combined with sewage, but instead drains into a separate pipe ("separated system" as shown on figure ES-2) and is discharged into nearby water bodies. Like CSOs, stormwater discharges are regulated by the federal Clean Water Act and state regulations. While CSOs happen occasionally when it rains, stormwater discharges occur every time it rains and have the potential to contribute pollutants such as metals, pesticides and pathogens that can be harmful to people and aquatic life.

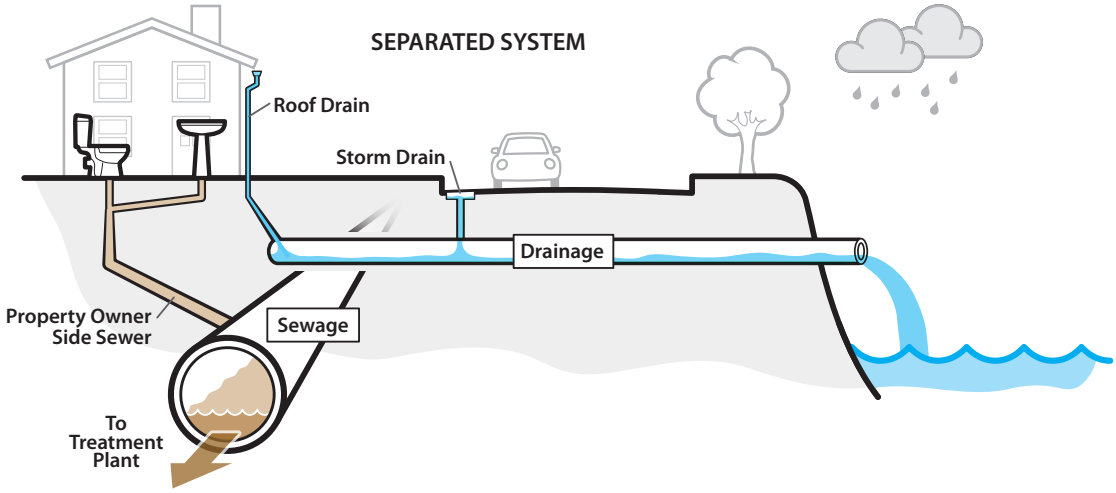


Figure ES-2. Schematic of a Separated System

What are the City's Previous CSO Reduction Efforts?

Planning for CSO control is a dynamic process that must respond to changing regulations and conditions. To date, the City has completed five CSO control plans beginning in 1980. Some of the projects involved maintenance or modification of existing sewer facilities, while others involved construction of diversion structures to direct flows away from CSO outfalls, or construction of storage facilities to store excess wastewater until flows decrease enough for the stored wastewater to be returned to the conveyance system. The major CSO reduction planning efforts are listed below.

- 1980 Facility Plan (201 Facilities Planning)
- 1988 CSO Reduction Plan
- 2001 CSO Reduction Plan Amendment
- CSO Reduction Plan Amendment 2005 Update
- 2010 CSO Reduction Plan Amendment

Why do we need more CSO reduction efforts?

The City manages 87 CSO outfalls. Because of previous CSO reduction efforts, 52 are now characterized as "controlled," meeting the control standard of "greatest reasonable reduction" of CSOs, meaning an average of no more than one overflow per outfall per year. While Seattle has made great progress in reducing the number of CSOs over the years, uncontrolled outfalls still remain. In 2013, 38 million gallons of untreated sewage and stormwater discharged at CSOs managed by the City. CSOs from the City's combined sewer system currently discharge into Puget Sound, Elliott Bay, Lake Washington, Longfellow Creek, Lower Duwamish Waterway, East Waterway, and Lake Union/Ship Canal.

CSOs present a range of public health and environmental concerns. Pollutants conveyed in CSOs can create human health risks from contact with water or consumption of fish/shellfish from areas of recent CSO discharge and can also cause impacts to aquatic life. The high variability in flow rates within the sewer system associated with heavy storms can also cause operational problems at the wastewater treatment plant.

Addressing the Remaining CSOs

Over the last 25 years, the City of Seattle has successfully reduced CSO discharge volumes into surrounding receiving waters by nearly 70 percent. However, there is still work to be done to control the remaining CSOs, and the final reduction in CSO volume is the most challenging.

In addition to the environmental and public health concerns, the City is required to control CSOs in order to comply with federal and state regulatory requirements. These requirements are further described below.

What Federal and State Regulations pertain to CSOs?

The federal Clean Water Act (33 United States Code 1251) requires water quality sufficient to allow people to swim, boat, fish, and enjoy our waterways. The law's requirements are intended to protect the environment, human health, and quality of life. Municipalities must obtain authorization to discharge wastewater, CSOs, and stormwater into surface water bodies.

The Clean Water Act (CWA) established the National Pollutant Discharge Elimination System (NPDES) program. The program limits the discharge of pollutants in order to meet water quality criteria. In Washington, the NPDES program is administered by the Washington State Department of Ecology (Ecology). Ecology's regulations in the Washington Administrative Code (Chapter 173-220) govern the City's and King County's NPDES permits.

The City manages sewage and stormwater throughout Seattle. Stormwater is managed in accordance with the City's NPDES municipal stormwater permit requirements. The City reports progress on its compliance activities annually to Ecology. The stormwater permit applies to the municipal separate storm sewers operated by the City within the geographic boundaries established by the permit.

The City's most recent wastewater NPDES permit (WA0031682) was modified on September 13, 2012; it allows wet weather discharges from permitted CSO outfalls. The permit also requires implementation of the "Nine Minimum Controls" to ensure adequate capacity and maintenance of the sewer system, defines monitoring requirements, establishes requirements for detailed reporting to Ecology, and allows discharges only as a result of precipitation events. In addition, the City must identify any improvements that have occurred since the last permit authorization. The City's next NPDES permit will be issued in October 2015.

What is the U.S. Environmental Protection Agency CSO Control Policy?

The Environmental Protection Agency, or EPA, has a CSO control policy that is the national framework for control of CSOs through the NPDES permitting program. Published on April 19, 1994, the policy provides guidance on how communities with combined sewer systems can meet Clean Water Act goals in as flexible and cost-effective a manner as possible. The policy has three main elements: Nine Minimum Controls, Long Term Control Plans, and Requirement to Meet Water Quality Standards. The LTCP specifically addresses all three policy elements.

What are the State Requirements?

Washington state law (Revised Code of Washington 90.48.4802) requires local governments to achieve a reasonable reduction in CSOs at the earliest possible date. The Washington Administrative Code (173-245-240) defines the "greatest reasonable reduction" as a long-term average of no more than one untreated discharge per year per outfall on a 20 year moving basis. This standard became the definition of a controlled outfall while outfalls that experience more than an average of one CSO occurrence per year on the 20 year moving average are considered uncontrolled and require City action.

In October 2010, Ecology and the City signed Agreed Order 8040, stipulating that the deadline for achieving the greatest reasonable reduction is December 31, 2025. On an annual basis, the City is required to report the duration and volume of each CSO discharge during the most recent year, steps taken during the most recent year to reduce CSOs, the CSO outfalls now meeting the definition of greatest reasonable reduction, and work planned for the next year to reduce CSOs. By May 2015, the City is required to submit an updated plan to Ecology (the LTCP), describing the remaining projects that will be implemented to reduce and bring CSOs under control.

What are the Presumption and Demonstration Approaches?

A presumption approach presumes that water quality goals will be achieved through performance standards, such as the once per year untreated discharge standard. The demonstration approach relies on monitoring to determine the effectiveness of CSO control measures. The State requires the City and King County to use the Presumption Approach.

What is the Consent Decree?

What is the Consent Decree?

The Consent Decree is a written agreement between the City of Seattle, Washington State Department of Ecology, the Environmental Protection Agency, and the U.S. Department of Justice that describes the actions that the City of Seattle must take to address violations of the Clean Water Act.

Until recently, EPA and Ecology have focused primarily on combined sewer systems when administering NPDES CSO discharge requirements. Seattle and other cities across the country have asked EPA for greater flexibility to make smart investments, using a range of tools to achieve federal and state water quality requirements, allowing jurisdictions to customize approaches to their specific situations. Recognizing the contribution of stormwater to water quality issues in local water bodies, and recognizing the overall benefits that can be achieved from a blend of stormwater and CSO reduction projects, the City negotiated a Consent Decree with EPA and the U.S. Department of Justice, allowing a more flexible and integrated approach for Seattle's compliance with the Clean Water Act and state regulations.

The Consent Decree, entered in United States District Court for the Western District of Washington on July 3, 2013, requires the City to submit a draft LTCP for regulatory and public review by May 30, 2014 and submit a final LTCP for regulatory approval by May 30, 2015, with the City's recommended solution. The Consent Decree also allows the City to develop, as an alternative, an "Integrated Plan" that proposes stormwater control projects to be implemented by the City and defer completion of some CSO facilities. The Integrated Plan must demonstrate that the proposed stormwater control projects will result in significant benefits to water quality beyond those that would be achieved by implementation of the approved CSO control measures only.

The Consent Decree encourages the use of green infrastructure as appropriate based on demonstrated effectiveness, together with the traditional engineered measures, as long as these combined measures provide substantially the same or greater levels of control than the traditional CSO control measures alone. The Consent Decree requires construction to be completed on all CSO control measures included in the approved LTCP by December 2025.

The Consent Decree includes a number of requirements for the Integrated Plan, including a pollutant load reduction analysis and an evaluation of projected benefits to water quality, ecology, and human health that would result from implementing the identified stormwater projects. The Integrated Plan must demonstrate that the proposed stormwater projects will provide greater water quality benefits compared to those CSO projects that would be deferred, and that they must meet the requirements of the Clean Water Act, the City's NPDES and municipal separate storm sewer system (MS4) permits, and EPA's CSO Control Policy.

What is the Long Term Control Plan?

What is the LTCP?

The LTCP builds upon the 2010 CSO Reduction Plan Amendment. The LTCP defines a comprehensive program and schedule for implementing projects and measures to control the remaining CSO outfalls.

As part of its regulatory compliance efforts, the City must prepare a CSO Reduction Plan Amendment, with updates every five years. The City prepared its first plan in 1988 with amendments in 2001, 2005, and 2010, and has undertaken a number of control efforts under those plans, including recent projects such as the Windermere, Genesee, and Henderson CSO control projects.

The LTCP is the City's next phase of CSO reduction, consistent with requirements in the Consent Decree. The LTCP defines a comprehensive program and schedule for implementing projects and measures to control overflows at of the City's 87 CSO outfalls.

Specifically, the LTCP will achieve the following objectives:

- Identify areas of the city where CSO reduction projects are required;
- Evaluate CSO control measures for reducing CSOs in affected areas;
- Select a preferred CSO control measure (solution) for each affected area;
- Recommend a schedule that will meet the Consent Decree compliance deadlines;
- Estimate LTCP program costs and associated rate impacts;
- Provide an updated post-construction monitoring plan and schedule; and
- Consider public and stakeholder input.

The City used the previously approved 2010 CSO Reduction Plan Amendment as the foundation to prepare the comprehensive LTCP, as specified by the Consent Decree.

The final LTCP will be submitted to EPA and Ecology in May 2015 as required by the Consent Decree. The LTCP will also be submitted as the 2015 CSO Reduction Plan Amendment to Ecology as required by the City's wastewater NPDES permit. The solutions identified in the LTCP must be approved by Ecology and EPA, and will be constructed in the years following 2015.

What is the Integrated Plan?

What is an Integrated Plan?

Under the Integrated Plan, the City proposes construction of stormwater and CSO projects by 2025, while deferring some CSO projects until 2030. The Integrated Planning process identified stormwater projects that provide significant benefits over some low frequency/low volume CSO projects. These low frequency/low volume CSO projects will have their planned construction deferred until after 2025.

The Consent Decree allows the City to submit a plan that proposes stormwater projects in addition to the CSO control measures included in the approved LTCP. Some of the CSO control projects can be deferred in order to enable earlier implementation of the stormwater projects, as long as that the stormwater projects will result in significant benefits to water quality beyond those that would be achieved by implementation of the CSO controls alone.

The Integrated Plan is being evaluated as an alternative to the LTCP. Whereas the LTCP focuses solely on reducing CSOs, the Integrated Plan meets EPA guidelines for integrating stormwater and CSO control in one plan.

The Integrated Plan identifies stormwater projects that will be completed by 2025, in addition to the CSO reduction projects that will be completed by 2025 and those CSO reduction projects to be deferred until after 2025. By prioritizing and sequencing projects in this way, greater water quality benefits may be achieved than by CSO reduction projects alone.

What are the Long Term Control Plan, Integrated Plan, and Environmental Impact Statement Alternatives?

The **LTCP Alternative** is focused solely on reducing CSOs under an approved Long Term Control Plan (LTCP). As a planning-level document, the LTCP presents a comprehensive strategy to reduce the remaining uncontrolled CSO discharges in the city. The City must address these CSOs to protect public health and the environment, and comply with the Clean Water Act and state regulations. The approved LTCP will recommend CSO control measures and an implementation schedule to meet the Consent Decree Construction Completion milestone date of December 31, 2025 and the Achievement of Control Status for each outfall as defined in the Consent Decree. The LTCP Alternative will implement CSO reduction projects in the Leschi, Montlake, Portage Bay, Duwamish, East Waterway, Magnolia, Downtown, Ballard, Fremont/ Wallingford, Delridge, and North Union Bay neighborhoods using one of four Options as shown in the following figures.

- Neighborhood Storage Options
- Shared West Ship Canal Tunnel Option
- Shared Ship Canal Tunnel Option
- Shared Storage Option

What are the Long Term Control Plan, Integrated Plan, and Environmental Impact Statement Alternatives?

There are three Alternatives in the Protecting Seattle's Waterways Plan: The LTCP Alternative, the Integrated Plan Alternative, and a No Action Alternative. A programmatic EIS has been prepared to analyze the environmental impacts of adopting and implementing each of these alternatives.

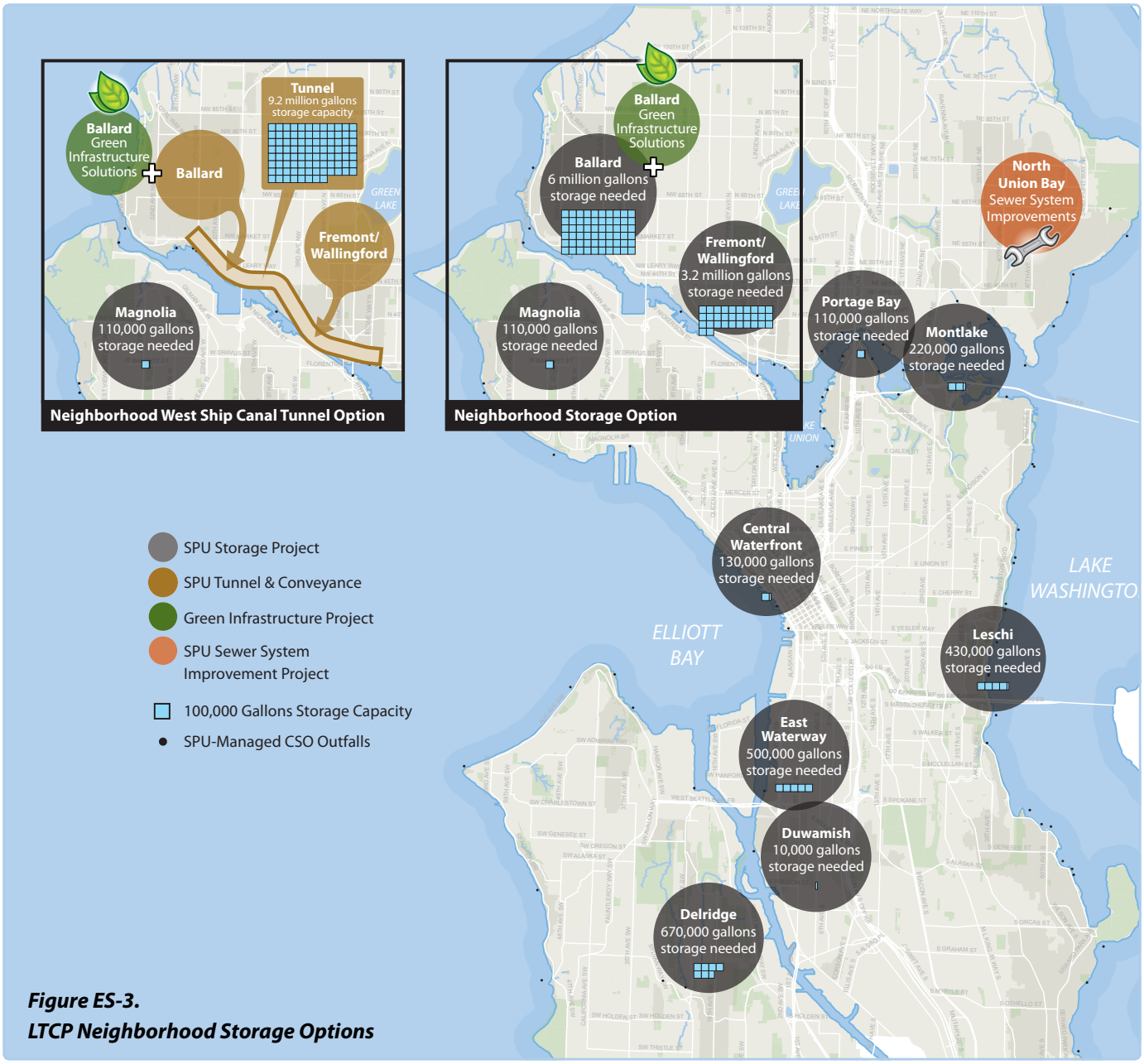


Figure ES-3.
LTCP Neighborhood Storage Options

Under the **Neighborhood Storage Option**, the City would build underground storage facilities in Ballard, Fremont/ Wallingford, Magnolia, Portage Bay, Montlake, Leschi, Central Waterfront, Duwamish, Delridge, and East Waterway CSO areas, and sewer system improvements in the North Union Bay CSO area. This option involves building the largest number of storage facilities throughout the city.

There are two variations in the Neighborhood Storage Option: one would provide storage in tanks/pipes only, and the other would include a tunnel (Neighborhood West Ship Canal Tunnel) in combination with tanks and pipes. The storage tank/pipe option involves the greatest number of affected locations. The Neighborhood West Ship Canal Tunnel Option was developed because the two CSO areas with the largest storage volumes (Ballard and Fremont/ Wallingford) are relatively close to one another. The Neighborhood West Ship Canal Tunnel Option likely reduces the number of facilities and neighborhood impacts.

Implementation of the North Union Bay sewer system improvements will require City coordination with King County because additional flows will be transferred to the King County system. Specifically, the City and King County will need to analyze the impacts of the proposed project on the downstream system and agree on an approach to address those impacts.

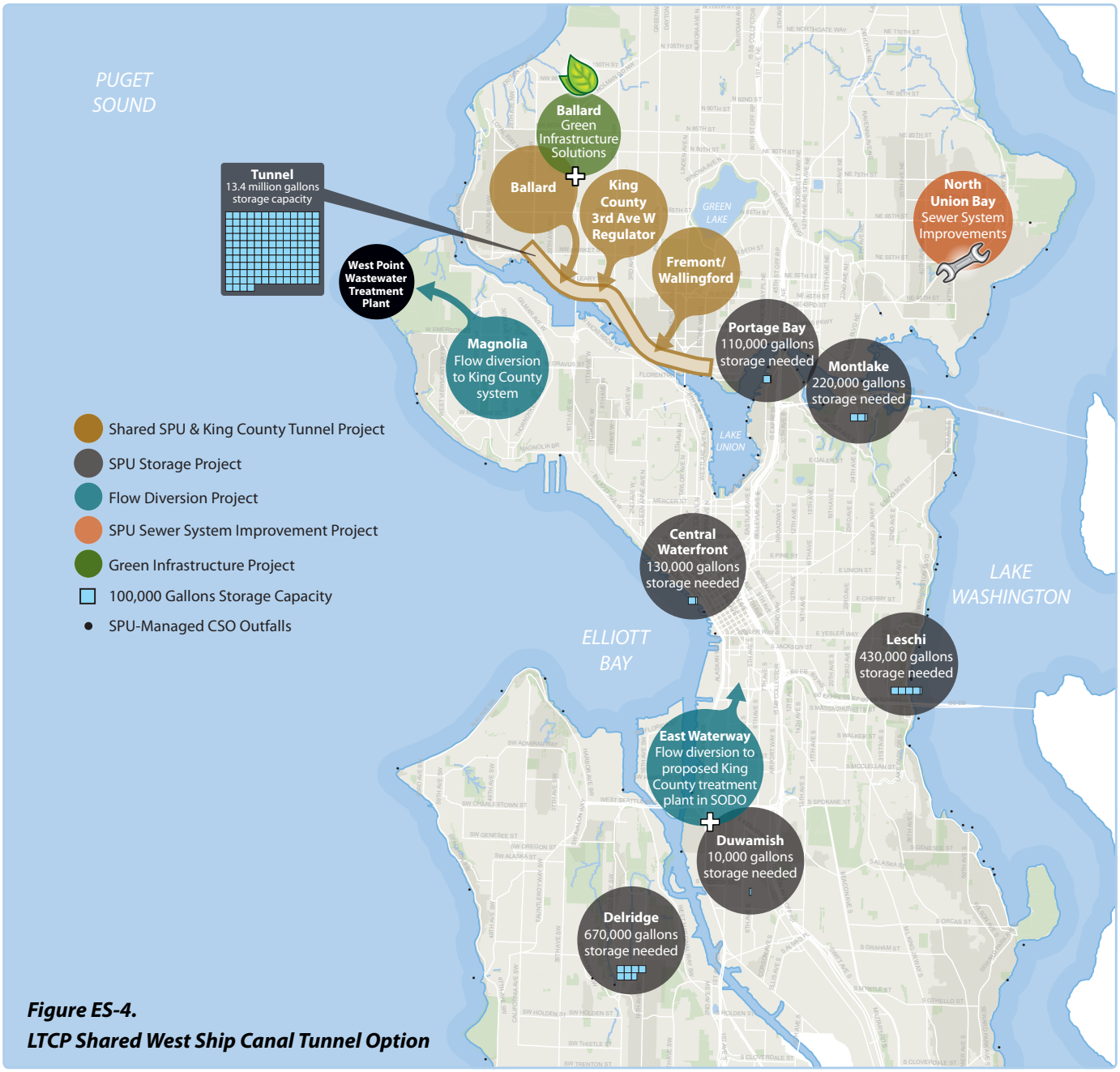


Figure ES-4.
LTCP Shared West Ship Canal Tunnel Option

The **Shared West Ship Canal Tunnel Option** combines three of the largest CSO areas into a single deep tunnel. The West Ship Canal Tunnel is proposed as a shared option because the three CSO areas (two from the City and one from King County) with the largest control volumes are relatively close to one another. The tunnel would extend from Fremont/Wallingford to Ballard and would provide the storage needed to address sewage overflows in Ballard, Fremont/Wallingford, and King County's 3rd Avenue West CSO basins. The tunnel would eliminate the need for a separate King County CSO project at an outfall near 3rd Avenue West.

Prior to implementing any shared projects between the City and King County, a shared project agreement would need to be signed between the two agencies.

Within this option, the remaining CSO areas would be controlled by their respective neighborhood control measures except for Magnolia and East Waterway, where flow diversions to King County's system are proposed. Any City flow diversion projects would require coordination with King County. Specifically, the City and King County would need to analyze the impacts of the proposed flow diversion projects on the downstream system and agree on an approach to address those impacts.

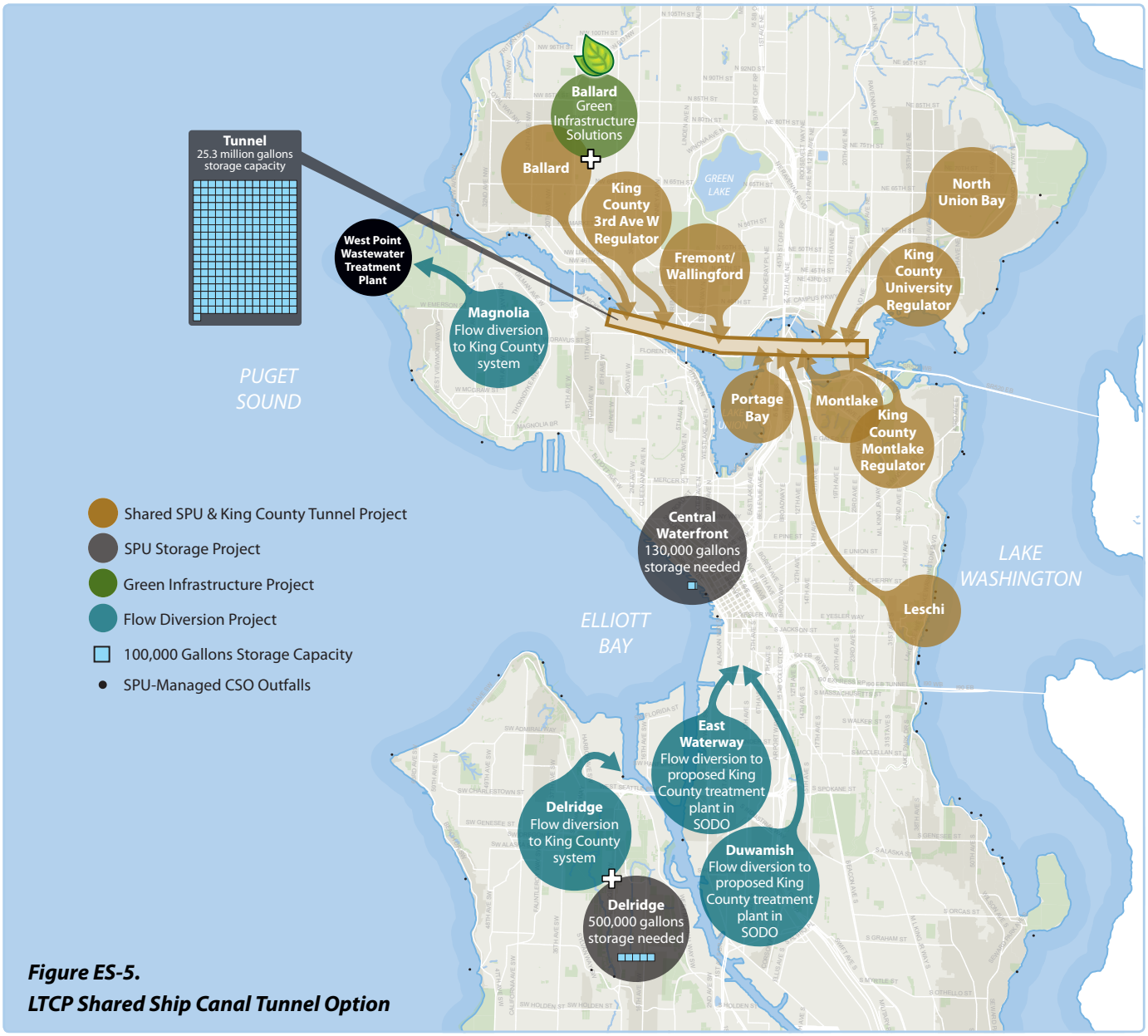


Figure ES-5.
LTCP Shared Ship Canal Tunnel Option

The **Shared Ship Canal Tunnel Option** combines the control volumes from six of City CSO areas along the Ship Canal and Lake Washington, and three of the largest King County CSO areas along the Ship Canal in a deep tunnel extending from the University District to Fremont/ Wallingford. The tunnel would provide the storage needed to address sewage overflows in the City's CSO areas of Ballard, Fremont/Wallingford, Portage Bay, Montlake, North Union Bay, and Leschi. The tunnel would also eliminate the need for three separate King County CSO projects at outfalls near Pacific Street (University Regulator), Montlake Avenue (Montlake Regulator), and 3rd Avenue West.

The remaining City CSO areas (Magnolia, Duwamish, East Waterway, and the northernmost Delridge CSO basin) would be diverted to King County under the assumption that flow diversions could be incorporated into mutual interagency agreements. The Central Waterfront and the southern Delridge CSO neighborhoods would continue to be served by their respective neighborhood control measures.

Prior to implementing any shared projects between the City and King County, a shared project agreement would need to be signed between the two agencies.

Specifically, the City and King County would need to analyze the impacts of the proposed project on the downstream system and agree on an approach to address those impacts.

Figure ES-6.
LTCP Shared Storage Option

Under the **Shared Storage Option**, the City and King County would jointly build larger but fewer storage tanks in three CSO areas: Fremont/Wallingford / King County 3rd Avenue West. CSO; North Union Bay / King County University Regulator CSO: and Montlake / Leschi / King County Montlake Regulator. These three shared storage projects were recommended in the approved 2012 King County CSO plan. In the Duwamish CSO area, the City would divert flows to a treatment facility proposed by King County. All other LTCP CSO areas would have the same storage facilities as proposed under the Neighborhood Storage Option.

Prior to implementing any shared projects between the City and King County, a shared project agreement would need to be signed between the two agencies.

Specifically, the City and King County would need to analyze the impacts of the proposed project on the downstream system and agree on an approach to address those impacts.

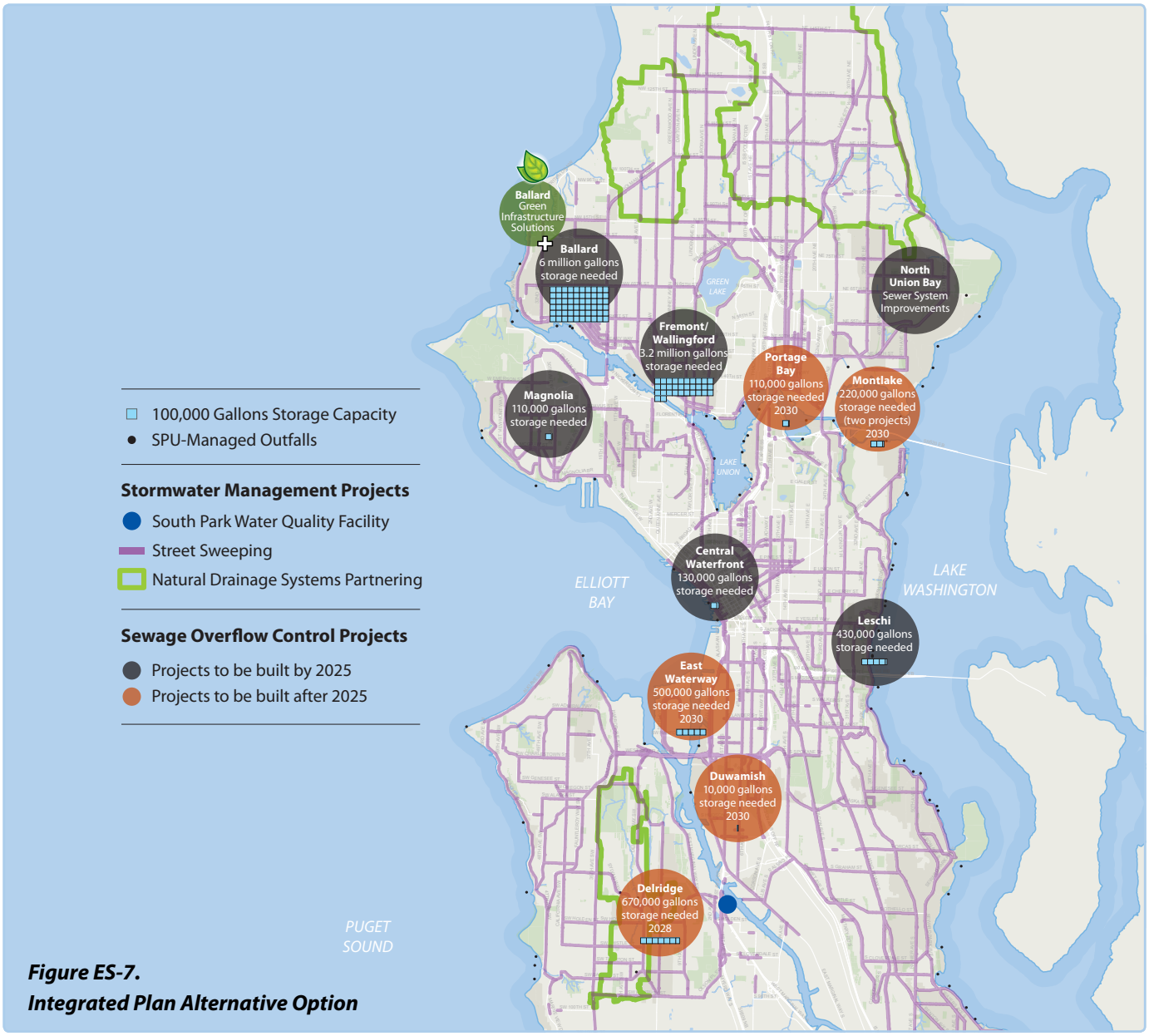


Figure ES-7.
Integrated Plan Alternative Option

The **Integrated Plan Alternative** aims to reduce CSOs and stormwater pollution. This alternative integrates stormwater pollution management with CSO reduction strategies to lead to a greater improvement in water quality, and represents a more comprehensive approach to water quality management in Seattle's waters. The proposed stormwater projects will result in significant benefits to water quality beyond those that would be achieved by implementation of lower benefit CSO controls alone. Under this alternative, the CSO control projects will still be implemented, however they will be delayed up to five years while stormwater projects are implemented.

Whereas the LTCP Alternative focuses solely on reducing CSOs, the Integrated Plan Alternative meets EPA guidelines for integrating stormwater and CSOs in one plan. Under the Consent Decree, the City may submit a plan that proposes stormwater control projects, provided that the stormwater projects will result in significant benefits to water quality beyond those that would be achieved by implementation of CSO controls alone, and the CSO control projects deferred would be completed by a specific date after 2025. The proposed stormwater control projects would be in addition to the CSO control measures included in the approved LTCP, and it would not replace them but allow some LTCP CSO projects to be deferred, if approved by EPA and Ecology. The proposed Integrated Plan projects are shown on Figure ES-7 and are listed in Table ES-2.

The EIS will also evaluate a **No Action Alternative**, as shown in Figure ES-8, to provide a baseline for comparison of potential effects of the Plan alternatives, as required by the State Environmental Policy Act (SEPA). Under the No Action Alternative, significant progress will be made in controlling CSOs through implementation of previously planned 2010-2015 CSO control projects identified in the 2010 CSO Reduction Plan Amendment. These projects are currently funded and are scheduled for implementation, and they will occur regardless of whether the Plan is implemented.

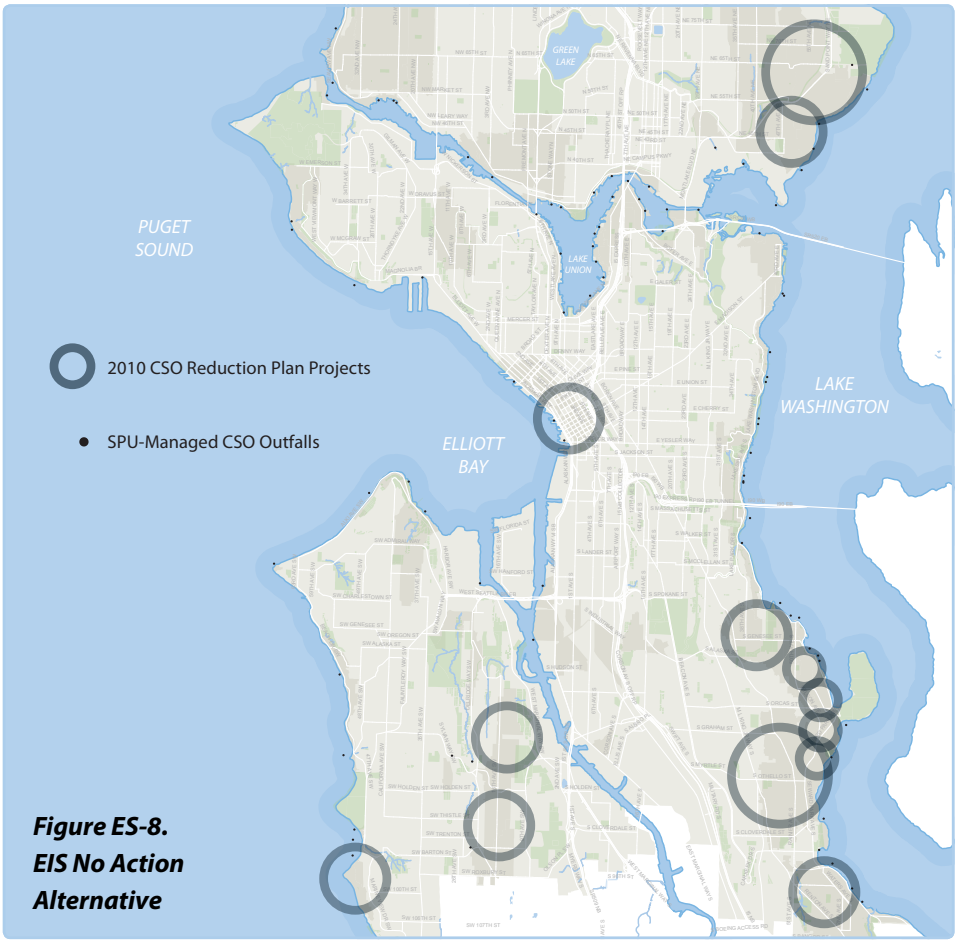


Figure ES-8. EIS No Action Alternative

How will the City and King County coordinate on CSO projects?

The City recognizes the importance of strong coordination with King County in controlling CSOs in the City. All of the proposed LTCP options have elements which may have an impact on King County's downstream wastewater system. Three of the proposed LTCP options include shared City/King County projects along the Ship Canal. Several of the proposed LTCP options include sewer system improvements which will convey additional wastewater volume to the downstream King County system. Regardless of which LTCP option is selected, coordination between the City and King County is critical to successfully designing, constructing, and eventually operating the proposed CSO control projects in the City.

The City and King County are continuing to work together closely to analyze and recommend LTCP options that are more cost-effective, produce better environmental outcomes, and minimize disruption to communities. King County must also reach its own independent conclusions about the benefits of a shared project to the regional system, and the implications of such as project to its own Long Term Control Plan and Consent Decree. Selection of a shared City/King County project will be dependent on the City's and County's analytical results as well as a number of joint factors mutually agreed upon in a City/County Coordination Plan. These factors include such things as which agency will be responsible for the design/construction/operations of the shared facility, each agency's project cost-share, operational and implementation roles and responsibilities, the process for dispute resolution, and the ability to fulfil regulatory and contractual obligations. If the City and King County choose to implement a shared City/King County project, then a shared project agreement between the two agencies will be necessary prior to designing and constructing the project. In addition, the City and King County will analyze the impacts of any recommended project on the downstream King County system and agree on an approach to addressing those impacts prior to constructing the project.

What is the Environmental Impact Statement?

The Programmatic Environmental Impact Statement (EIS) evaluates the impacts associated with adopting and implementing either of the two Plan alternatives: (1) the Long Term Control Plan, and (2) the Integrated Plan. The EIS also includes an evaluation of a No Action Alternative, as required by SEPA. The Programmatic EIS will be used to assist decision makers in assessing the environmental impacts associated with implementation of the Alternatives developed for The Plan.

What is an EIS?

An Environmental Impact Statement is a document that discloses the probable significant adverse environmental impacts of a proposed project or plan, evaluates reasonable alternatives, discusses ways to avoid or minimize impacts, and identifies any proposed mitigation measures.

Are there significant impacts that can't be mitigated?

Implementation of the Plan will involve a wide range of short term impacts associated with the construction of large infrastructure projects, including large tanks, tunnels, pump stations, and associated pipes and appurtenances. Depending upon the size, location and type of project, these impacts would include potentially significant traffic impacts, including temporary road closures and traffic detours. Other construction-related impacts of potential significance include short term increases in noise and dust, and potential disruptions of access to business, residential, or recreational facilities. These impacts, however, are expected to be mitigated by compliance with all applicable regulations and permit requirements, and as such will not be significant.

Operational impacts include the potential for odor and noise generation, land use and recreational impacts and potential operational implications to King County's regional wastewater system. Given appropriate design and coordination with affected parties, there are no long term or operational impacts associated with implementation of the Plan Alternatives that cannot be mitigated. Implementation of the No Action alternative would result in potentially significant long term adverse impacts to water quality and aquatic habitat in the Plan area.

How do cumulative impacts compare among the Alternatives?

Cumulative impacts are those that could result from the combination of individual effects of multiple actions (projects) over time. The Plan would be implemented in an urbanized area, and projects identified in the Plan could be constructed in areas that may have recently been subject to large-scale construction projects, or will be subject to construction of future planned projects. In addition, there is a potential for construction under the Plan implementation to coincide with the construction of other projects. For instance, King County's 2012 CSO Control Plan identifies several CSO reduction projects that would be located in the same general areas where projects under the City's LTCP Alternative would be constructed.

What are the LTCP Alternative Cumulative Impacts?

What are the LTCP Options?

- Neighborhood Storage Option
- Shared West Ship Canal Tunnel Option
- Shared Ship Canal Tunnel Option
- Shared Storage Option

The **Neighborhood Storage Option** results in the potential for construction-related cumulative impacts that would affect the broadest area, because it involves construction of the largest number of storage tanks and storage pipes in neighborhoods throughout the City, including the Ship Canal, Lake Washington, Longfellow Creek/Duwamish and Elliott Bay/Lake Union Neighborhoods. While many of these projects would be constructed within public rights of way, there would be construction-related traffic, road closures and/or traffic constraints, dust, odor, and other short term impacts that would last between one and five years. In addition to the projects constructed by the City, King County would construct additional storage tanks and storage pipes in the Fremont/Wallingford, Montlake, and North Union Bay neighborhoods, adding to the impacts in those neighborhoods. The prolonged periods of construction effects could constitute a cumulative impact.

The **Shared West Ship Canal Tunnel Option** would have a potential for cumulative impacts similar to the Neighborhood Storage and Shared Storage Options. It may result in fewer impacts to the Ballard and Fremont/Wallingford neighborhoods associated with construction

of storage tanks, but it would create a longer duration and potentially more intense impacts (up to 3.5 years or more) at the tunnel entrance portal, which would likely be located along the Lake Washington Ship Canal in Ballard, and the exit portal, which would likely be located in the Fremont/ Wallingford neighborhood. Replacing storage tanks and pipes in the East Waterway and Magnolia neighborhoods with lower construction impact flow transfers would reduce the potential for cumulative impacts in these neighborhoods.

The **Shared Ship Canal Tunnel Option** would have the lowest potential for cumulative impacts in terms of neighborhoods affected, because it would substantially reduce the number of storage facilities located throughout the city constructed by the City and King County. However, impacts would be concentrated for up to seven years at the portals, likely to be located in the vicinity of the south side of the Ship Canal, and the Portage Bay/Montlake neighborhoods in the vicinity of North Union Bay.

The **Shared Storage Option** would affect fewer neighborhoods than the Neighborhood Storage Option because certain CSO reduction projects would be shared by the City and King County, although this option would require the largest amount of property acquisition of all of the options.

What are the Integrated Plan Alternative Cumulative Impacts?

What does the Integrated Plan Alternative consist of?

- Natural Drainage System (NDS) Partnering
- Street Sweeping Expansion
- South Park Water Quality Facility

The cumulative impacts associated with the Integrated Plan relate largely to construction of the LTCP storage facilities, as described for the LTCP Alternative. Implementing the Integrated Plan Alternative would not represent a substantial increase in cumulative impacts over the LTCP Alternative. The expansion of street sweeping on City arterials would not affect overnight parking and NDS Partnering would have minimal short-term construction-related and long-term impacts. Construction of the South Park Water Quality Facility would not result in extensive construction-related impacts. The facility is expected to be sited in an area with compatible land use, with a low potential to cause long term changes in use. Under the Integrated Plan Alternative, construction of LTCP projects would be delayed in some neighborhoods, potentially resulting in reduced or increased cumulative impacts depending on the neighborhood and project schedules.

How did the City evaluate the LTCP and Integrated Plan Alternatives?

The **LTCP Alternative** is evaluating 4 final LTCP options considering both an evaluation of the non-monetary factors and costs. The technique is called Multi-Objective Decision Analysis (MODA), which incorporates a mechanism for consideration of non-monetary, social, and environmental factors as well as cost to create a structured comparison of competing solutions in support of a decision. The Draft LTCP performed a "rating and ranking" of the LTCP options in accordance with EPA requirements in the "Combined Sewer Overflows Guidance for Long-Term Control Plan, 1995". The results are below in Table ES-1. The highest ranked option is listed as "1" and the lowest ranked option is listed as "5".

Table ES-1. LTCP Ranking Results

LTCP Option	Value Score Rank
Neighborhood West Ship Canal Tunnel	1
Shared Storage	2
Neighborhood Storage Tanks	3
Shared Ship Canal Tunnel	4
Shared West Ship Canal Tunnel	5

The Integrated Plan Alternative used a MODA process similar to the LTCP, in addition to the Consent Decree requirements, to help select the candidate stormwater projects for potential inclusion in the Integrated Plan. The Draft Integrated Plan performed a "rating and ranking" of the candidate stormwater projects. The results are shown below in Table ES-2. The highest ranked candidate project/ program is listed as "1" and the lowest ranked option is listed as "10".

Table ES-2. Integrated Plan MODA Evaluation Results

Candidate project/program	Total score Rank
South Park WQ Facility	1
Street Sweeping Expansion Arterials	2
Street Sweeping Expansion Residential	3
NDS Partnering	4
SW Hinds SD StormFilter Vault	5
Piper's Cascades	6
Longfellow Cascades	7
U Village Filterras	8
South Myrtle St. StormFilter Vault	9
South Myrtle St. Shoulder Stabilization	10

The City selected the proposed stormwater projects for inclusion in the Integrated Plan Alternative based on comparison of the pollutant loads, exposure assessments, and the MODA scores for the candidate stormwater projects as compared to the CSO projects proposed for deferral. The City selected NDS Partnering over Street Sweeping Expansion Residential because their MODA evaluation score was very close and the City desired to have a variety of projects in the Integrated Plan. Table ES-3 summarizes the CSO projects that would be deferred and the stormwater projects that would be implemented, and shows that the proposed stormwater projects treat or remove significantly larger discharge volumes than the deferred CSO projects.

Moreover, the proposed stormwater projects address discharges that are far more frequent than the existing discharges from the CSOs identified for deferral, which results in greater pollutant removal by the stormwater projects and significant benefits for Seattle's waterways. The City selected the CSO projects for deferral largely because they are already close to meeting the one discharge per year standard; consequently, the control volumes associated with the deferred CSO projects are small compared to the other CSO projects prescribed in the LTCP. The table also shows that the proposed stormwater projects will reduce pollutant loads and exposures in several receiving water bodies that are not addressed by the deferred CSO projects. In addition, the NDS Partnering projects would provide flow control benefits, such as reduced peak flows, reduced channel erosion, and increased baseflow to Longfellow, Piper's Creek, and Thornton Creek.

Table ES-3. Preferred Option for the Integrated Plan Alternative

Project name	Project type	Receiving water body	Average existing discharge frequency (average events/ year)[a, b]	Average volume treated or removed (MG/ year)[c]	Estimated Annual Total Suspended Sediment Removed (kg)[d]	Estimated Annual Total Fecal Coliform Removed (billion CFU[e])
Stormwater projects/programs to be implemented by 2025						
NDS Partnering	Bioretention	Longfellow Creek Piper's Creek Thornton Creek	119	35.5	7,704	17,910
South Park WQ Facility	Basic, active treatment (e.g., CESF[f])	Duwamish Waterway	119	73.9	24,741	52,700
Street Sweeping Expansion Arterials	Street sweeping (weekly arterial sweeping)	Multiple	119	1,527[g]	36,200	2,100
LTCP projects to be constructed by 2030						
LTCP CSO Basin 099	Offline storage pipe	West Waterway of the Duwamish River	1.5	0.17	20	651
LTCP CSO Basin 107	Offline storage tank	East Waterway of the Duwamish River	4.6	1.11	494	4,346
LTCP CSO Basin 111	Offline storage pipes	Duwamish River	1.7	0.01	4	34
LTCP CSO Basin 138	Offline storage tank	Portage Bay	1.4	0.09	11	360
LTCP CSO Basin 139	Offline storage pipes	Portage Bay	1.2	0.01	1	22
LTCP CSO Basin 140	Offline storage pipes	Portage Bay	3.7	0.05	6	201

a. For stormwater projects, the existing discharge frequency was estimated using data from 10 years' worth of recorded rainfall data from an SPU rain gauge. A discharge event was considered as an "event" if, on that particular day, the precipitation depth was at a minimum of 0.03 inch. Based on collected flow monitoring data, a rainfall depth of 0.03 inch generates flow in the storm sewer system.

b. The existing discharge frequencies for the candidate LTCP projects can be found in the 2012 Annual CSO Report.

c. The estimated average volume removed for the candidate LTCP projects was calculated using the moving 20-year average simulated volumes, without the consideration of climate change. This means that the precipitation data used for modeling was not modified to account for potential effects of climate change on rain; therefore, a scaling factor of 1 was assumed. See Volume 2 of the LTCP report on a more detailed discussion of the hydraulic modeling conducted.

d. TSS is displayed to give an indication of the pollutant removal. More detail can be found in Volume 3 – Integrated Plan

e. CFU=colony forming unit and is an estimation of the viable bacteria numbers

f. CESF is chitosan-enhanced sand filtration.

g. Volume is based on estimated runoff from swept streets.

What are the implementation schedules for the LTCP and Integrated Plan?

The City's Consent Decree requires that the recommended control measures for the LTCP complete construction by 2025. The City has proposed options that meet this requirement and has also evaluated additional options that extend beyond the compliance date, but that can potentially be more cost effective and reduce impacts to the communities.

Figure ES-9 presents the overall schedule for the CSO control measure projects for each LTCP Option. The schedules show the project duration and two key Consent Decree milestone dates: Construction Completion and Achievement of Controlled Status.

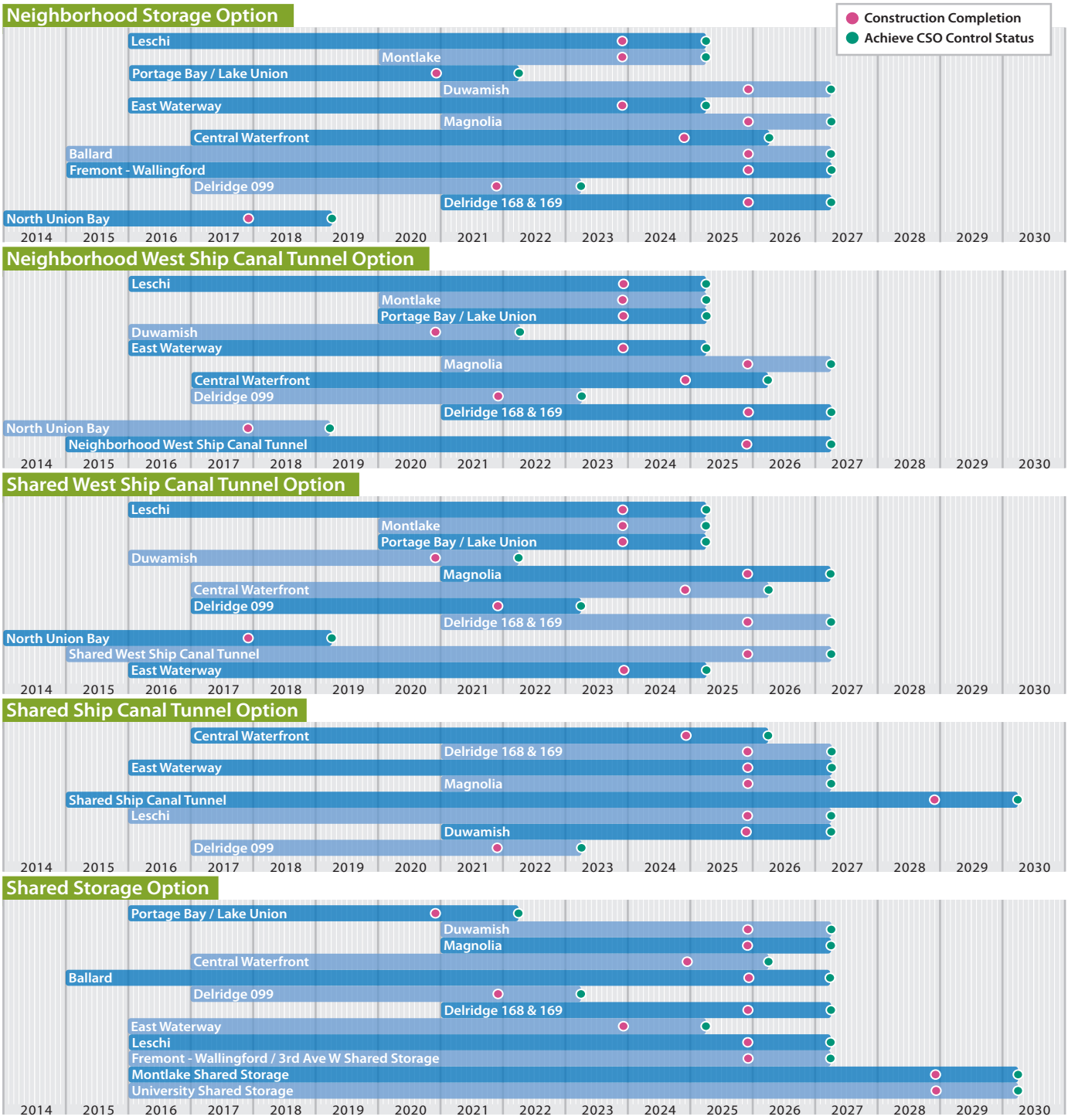
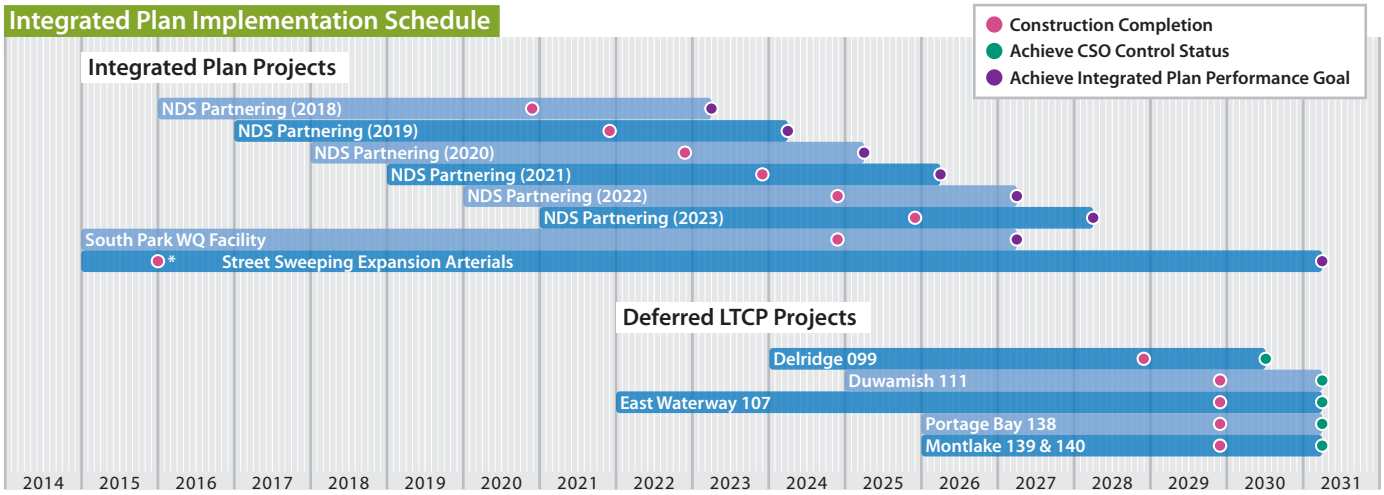


Figure ES-9. LTCP Option Implementation Schedules

The Integrated Plan would implement three stormwater control projects by 2025, one of the LTCP Options, and defer completion of construction of six LTCP projects until 2030. Figure ES-10 presents the overall schedule for the Integrated Plan Projects and the deferred CSO projects. The schedule shows three key milestone dates: Construction Completion for both the Integrated Plan and LTCP, as well as Integrated Plan Achievement of Performance Goal and Achievement of Controlled Status for the deferred LTCP projects.



* Purchase of sweepers and overall project implementation

Figure ES-10. Integrated Plan Implementation Schedule

What are the rate impacts for the LTCP and Integrated Plan?

Using planning-level cost estimates, the City evaluated the overall impact to the monthly wastewater and drainage rates to implement the LTCP and the Integrated Plan alternatives.

What are the baseline rates?

The first step is to estimate the monthly baseline rates which do not include the LTCP or Integrated Plan alternatives. The monthly wastewater and drainage rates for the current Strategic Business Plan (SBP) were used to estimate the baseline rates from 2015 through 2045. The King County Treatment baseline rates also include the King County treatment increases provided by the County in June 2013 and the rate impact estimates provided in the King County Executive's 'Recommended Combined Sewer Overflow Control Plan', June 2012. The baseline monthly rates are listed in Table ES-4.

Table ES-4. Baseline Monthly Wastewater and Drainage Rate Estimate (with Inflation)

Baseline Rates	2015	2020	2025	2030	2035	2040	2045
Wastewater [1]	$17.85	$27.29	$36.44	$43.30	$47.11	$51.25	$55.76
Drainage [2]	$29.13	$42.66	$51.48	$56.23	$61.41	$67.08	$73.27
King County Treatment Wholesale Rate [3]	$33.31	$41.42	$39.26	$39.82	$46.39	$53.55	$61.37
Total Baseline Rate	$80.29	$111.37	$127.18	$139.35	$154.91	$171.89	$190.40

(1) The wastewater baseline rate represents the typical residential monthly system rate at 4.3ccf consumption per month. All LTCP-related capital costs have been removed.

(2) The drainage baseline rate represents the typical residential monthly rate for the average parcel, which is a small residential lot between 5,000-6,999 square feet (SRT3). All LTCP-related capital costs have been removed.

(3) King County charges a wholesale treatment rate to cities and local wastewater districts who send flows to the regional system. The City of Seattle passes through this rate to customers via the treatment component of the sewer rate. This analysis assumes the typical residential monthly bill with consumption of 4.3ccf.

What are the rate impacts for CSO Control?

The City analyzed how each option for the LTCP alternative may affect monthly wastewater and drainage rates between 2015 and 2045. Table ES-5 below shows the total monthly estimated rates (baseline and LTCP option) between 2015 and 2045 for each LTCP option.

Table ES-5. Monthly Wastewater and Drainage Rates for LTCP Implementation (with Inflation)

LTCP Option	2015	2020	2025	2030	2035	2040	2045
Total Baseline Rate only	$80.29	$111.37	$127.18	$139.35	$154.91	$171.89	$190.40
Neighborhood West Ship Canal Tunnel Option	$81.10	$116.50	$134.18	$146.25	$162.01	$179.23	$198.00
Shared Storage Option	$81.02	$114.69	$131.82	$144.04	$159.65	$177.98	$196.77
Neighborhood Storage Tank Option	$80.99	$116.35	$133.56	$145.66	$161.50	$178.70	$197.52
Shared Ship Canal Tunnel Option	$81.15	$114.90	$133.19	$144.11	$159.65	$178.07	$196.86
Shared West Ship Canal Tunnel Option	$80.95	$115.67	$132.74	$144.89	$160.67	$177.90	$196.70

Figure ES-11, Monthly Wastewater and Drainage Rates for LTCP Implementation, shows the total monthly rate (Total Baseline Rate and additional LTCP Rates). The LTCP Neighborhood Storage Option was used to illustrate the impact of the LTCP options when combined with the Baseline Wastewater and Drainage rates for Figure ES-11.

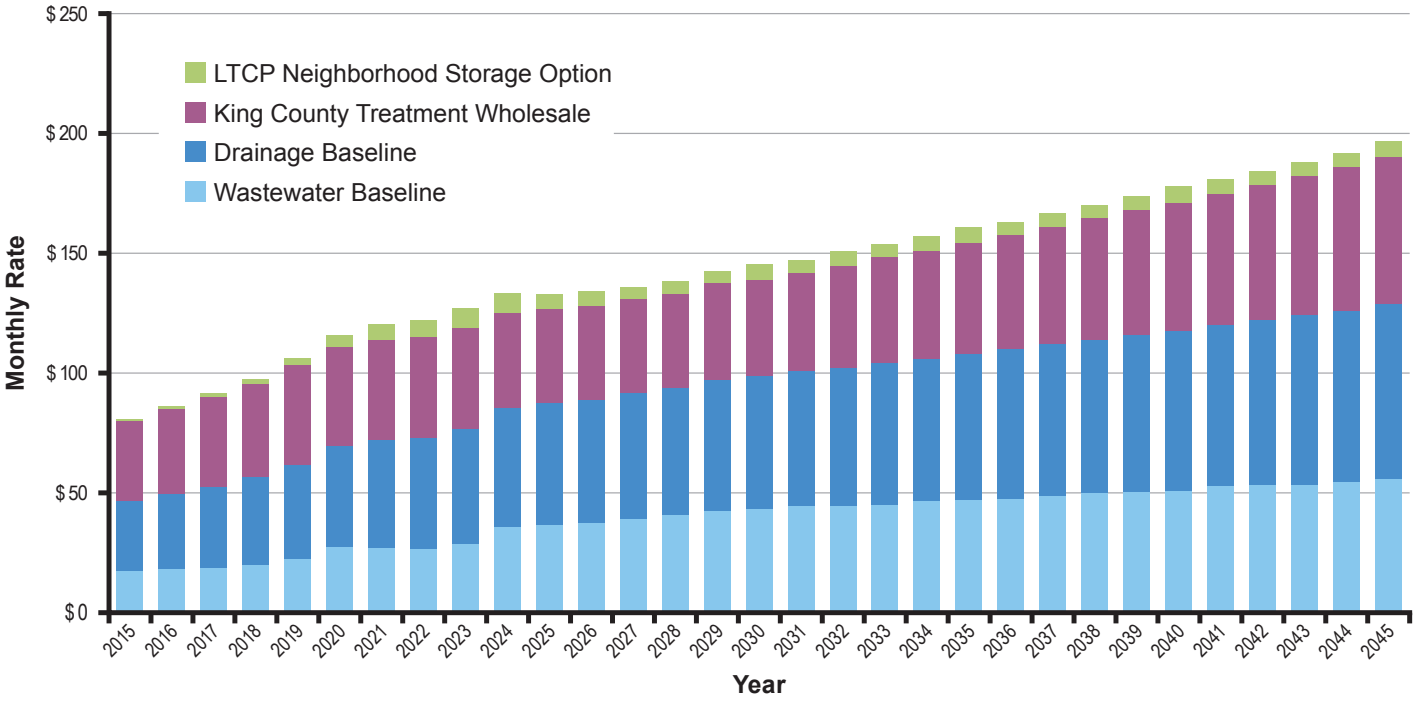


Figure ES-11. Monthly Wastewater and Drainage Rates for LTCP Implementation

The City also analyzed how the Integrated Plan alternative may affect monthly wastewater and drainage rates between 2015 and 2045. Table ES- 6 shows the total monthly estimated rates between 2015 and 2045 if the Integrated Plan alternative was implemented and a portion of the LTCP projects were deferred to construct the proposed Integrated Plan stormwater projects by 2025. Figure ES-12 shows the additional rate increases for the Integrated Plan compared with the LTCP. The Neighborhood Storage Tank Option is used to illustrate the impact of the Integrated Plan when combined with the LTCP. Implementation of the Integrated Plan has the same impact on the other LTCP options detailed above as six LTCP CSO projects are deferred past 2025, while drainage intensive projects are implemented beginning in 2016. In all scenarios, the Integrated Plan produces elevated rates over the life of the project as a result of deferral of the six LTCP CSO projects and ongoing operations and maintenance expenses related to the Integrated Plan programs.

Table ES-6. Monthly Wastewater and Drainage Rate Estimate for the Integrated Plan (with Inflation)

LTCP Option	2015	2020	2025	2030	2035	2040	2045
Total Baseline Rate	$80.29	$111.37	$127.18	$139.35	$154.91	$171.89	$190.40
LTCP (Neighborhood Storage Tank Option)	$80.99	$116.35	$133.56	$145.66	$161.50	$178.70	$197.52
Integrated Plan (LTCP Neighborhood Storage Tank Option With Integrated Plan)	$81.12	$116.44	$135.92	$147.24	$163.03	$180.33	$199.26

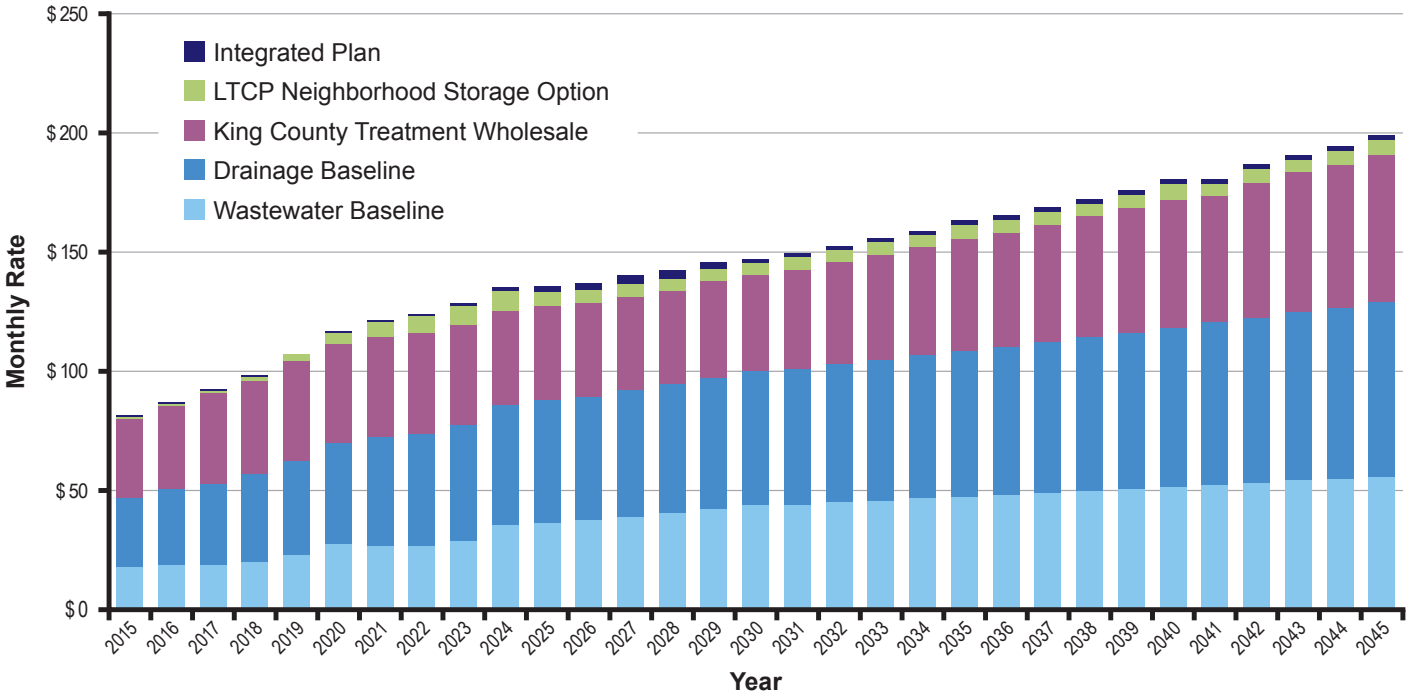


Figure ES-12. Monthly Wastewater and Drainage Rate Increase Estimates for Integrated Plan and Partial Deferral of LTCP projects

What is the schedule for completing the Plan to Protect Seattle's Waterways?

Figure ES-13 summarizes the schedule for completing the Plan to Protect Seattle's Waterways. By May 30, 2014, the Draft Plan will be submitted for EPA and Ecology review and comment, and will present the evaluation of the LTCP and Integrated Plan alternatives. The City will issue a public notice, hold a public hearing, and provide an official public comment period for the Draft EIS. In addition, the City will issue a public notice, hold a public meeting, and provide a public comment period for the Draft LTCP and Draft Integrated Plan. After receiving public, EPA, and Ecology comments, additional evaluation will be performed and a preferred LTCP and/or Integrated Plan will be recommended by the end of 2014. The option that is selected as the preferred alternative could have smaller elements that are modified from those in the draft LTCP/Integrated Plan. For example, smaller flow diversions could become small storage tanks. However, the major CSO control measure, such as Shared Storage tanks along the Ship Canal or the Shared Ship Canal tunnel, would not change. In early 2015, the City Council will review and adopt the Final Plan through a City Ordinance process. By May 30, 2015, the Final Plan will be submitted to EPA and Ecology for final approval. By the end of 2015, the Final Plan is anticipated to be approved by EPA and Ecology, and implementation will commence in late 2015 or early 2016.

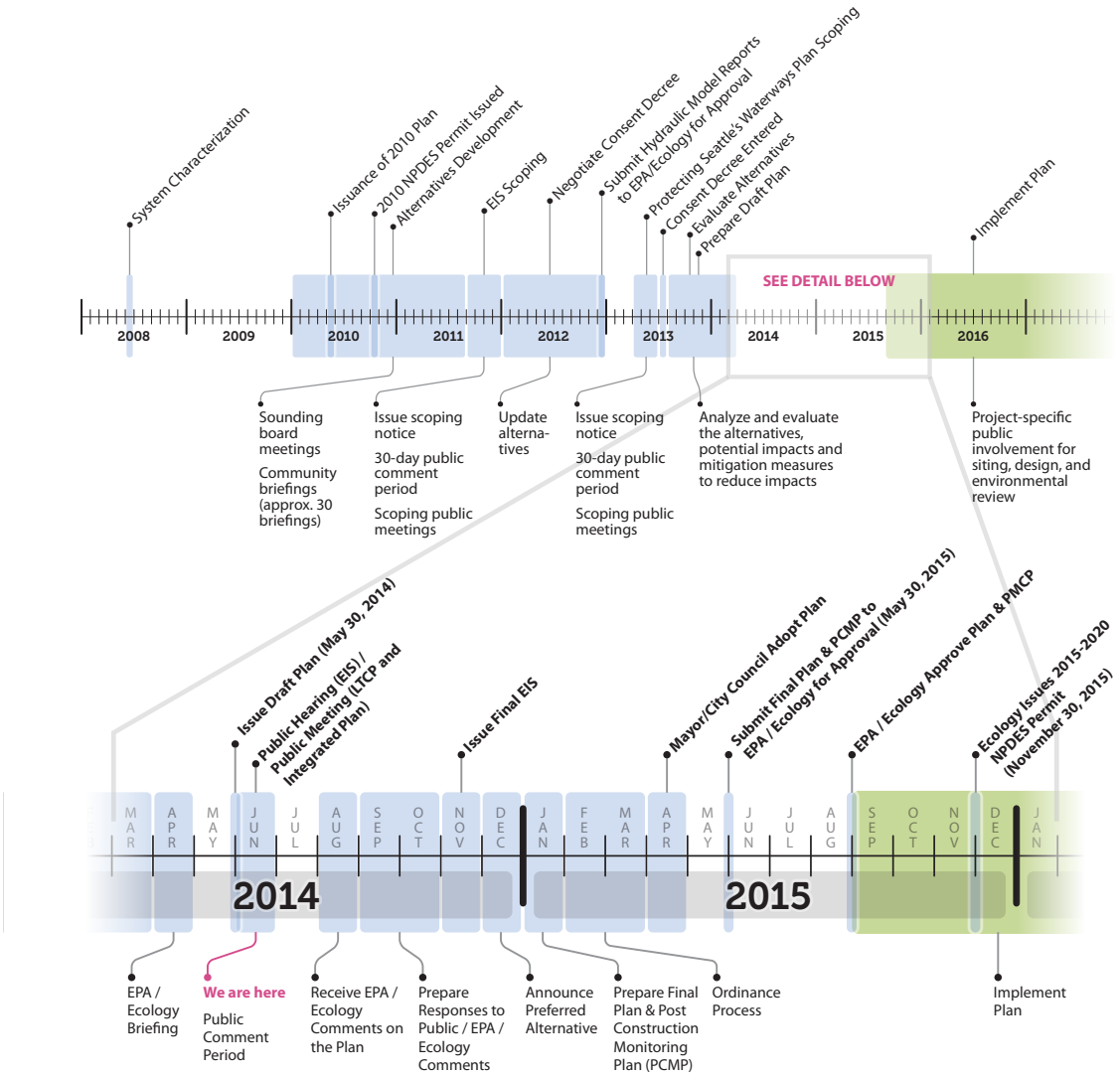


Figure ES-13. Current and Overall PSW Schedules

Seattle Public Utilities

Protecting Seattle's Waterways

Learn more about the Protecting Seattle's Waterways Plan online at www.seattle.gov/CSO

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